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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/519,882

08/04/2005

Paul Meldahl

1101.143US01

7390

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04/10/2008

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EXAMINER

HUGHES, SCOTT A

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

04/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,882	Applicant(s) MELDAHL, PAUL	
	Examiner SCOTT A. HUGHES	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 6-32 is/are pending in the application.
- 4a) Of the above claim(s) 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-23 and 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments and amendments to the drawings, title, and claims filed 12/21/2007 are sufficient to overcome the objections to the title and drawings, and to overcome the rejections under 35 USC 112.

Applicant's arguments filed 12/21/2007 with respect to the rejections under 35 USC 102 and 35 USC 103 have been fully considered but they are not persuasive.

Applicant argues that the Berni reference does not teach that the monitoring is carried out using an apparatus which is moved relative to the earth's surface during the response period. Applicant argues that the Berni reference is directed to a monitoring apparatus that remains stationary relative to the earth during the response period. This argument is not persuasive because Berni teaches that the monitoring apparatus is mounted to an airplane, helicopter or possibly a balloon, and that the monitoring apparatus is moved along as it surveys the area. Applicant's claim limitation does not give any specifics as to the type or amount of movement between the monitoring apparatus and the earth. Because a helicopter or airplane will not stay completely stationary, it will have at least some movement relative to the earth's surface as it moves from monitoring point to monitoring point to survey the area. Because the helicopter or airplane will not remain completely stationary, there will be relative movement between the monitoring apparatus and the earth's surface.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4, 6-13, 16-19, 21-23, 25-28, 30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Berni (5070483).

With regard to claim 1, Berni discloses a method of seismic exploration which comprises: generating a seismic event (Fig. 10) (Column 2; Column 5, Lines 1-10); applying the seismic event to the earth's surface (Fig. 10) (Column 2; Column 5, Lines 1-10); detecting a response to the event, the detected response including P-waves and S-waves in the earth's surface (Figs. 3-4) (abstract; Column 4, Line 44 to Column 5, Line 45; Columns 8-12; Column 18, Line 50 to Column 19, Line 62); and analyzing the detected response (Column 3, Line 45 to Column 5, Line 45; Column 7, Line 16, to Column 21); and in which: the detecting step comprises monitoring and recording the response to the seismic event in the form of movements of particles at the earth's surface (Column 4, Line 44 to Column 6, Line 45), from a position spaced from the earth's surface (Figs. 3-8) (Column 4, Line 44 to Column 6, Line 45), the detecting step being carried out over a response period, the response period being a predetermined period of time after the seismic event (abstract; Column 2; Column 3, Line 45 to Column 6, Line 45) (Fig. 9); and the analyzing step comprises analyzing the movements of particles at the earth's surface in the recorded response to the seismic event during the

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response period response (Column 3, Line 45 to Column 6, Line 45; Column 7, Line 16, to Column 21). Berni discloses that the monitoring is carried out using monitoring apparatus which is moved relative to the earth's surface during the response period (Column 4, Line 44 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56).

With regard to claim 2, Berni discloses that the movements of the particles are monitored using light, in the form of visible light (Column 5, Line 45 to Column 8, Line 19; Column 9; Columns 13-14).

With regard to claim 4, Berni discloses that the analyzing step includes the elimination from the detected response of noise caused by the relative movement of the monitoring apparatus (Column 5, Line 10 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56; Column 18, Line 24 to Column 20, Line 22).

With regard to claim 6, Berni discloses that the monitoring apparatus comprises several monitoring devices which are used simultaneously at different locations (Column 5, Line 10 to Column 6, Line 37).

With regard to claim 7, Berni discloses that the response is transformed to and recorded in digital form (Column 6, Line 23 to Column 8).

With regard to claim 8, Berni discloses that the analyzing step comprises analyzing surface particle displacements (Columns 5-6).

With regard to claim 9, Berni discloses that the monitoring apparatus comprises a source of coherent mono frequency light directed at the surface area being monitored, and a receiver for reflected coherent light (Columns 5-6; Column 7, Line 55 to Column 8, Line 3) (Figs. 2-8).

With regard to claim 10, Berni discloses that the coherent light and a reference beam are used to make speckle patterns by means of interferometry, and changes in the speckle patterns are analyzed in the analyzing step (Figs. 2-8) (Column 3, Line 45-68; Column 4, Line 46 to Column 6, Line 10; Column 6, Line 45 to Column 12).

With regard to claim 11, Berni discloses that the monitoring apparatus comprises video recording apparatus (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 12, Berni discloses that the video recording apparatus includes one or more cameras operating on the basis of visible light. (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 13, Berni discloses that the earth's surface is the seabed, the seismic event is applied to the sea or directly to the seabed and the monitoring apparatus is spaced above the seabed (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 16, Berni discloses that the monitoring apparatus is towed (Column 5, Lines 10-45) and the analyzing step includes the elimination from the detected response of noise representing disturbances caused by the motion of the monitoring apparatus (Column 12, Line 55 to Column 16).

With regard to claim 17, Berni discloses that the particles whose movements are detected are sand particles on the sea floor (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 18, Berni discloses that the seismic event comprises a seismic wave having a wavelength in the range 5 to 100 m and a duration of up to 3 s (Fig. 9) (Columns 1-2).

With regard to claim 19, Berni discloses that the response period is from 4 to 8 seconds (Fig. 9) (Columns 1-2).

With regard to claim 21, Berni discloses an apparatus for carrying out seismic exploration which comprises: means for generating a seismic event; means for applying the seismic event to the earth's surface (Fig. 10) (Column 2; Column 5, Lines 1-10); detecting apparatus for detecting a response to the event including P-waves and S-waves in the earth's surface (Figs. 3-4) (abstract; Column 4, Line 44 to Column 5, Line 45; Columns 8-12; Column 18, Line 50 to Column 19, Line 62); and means for analyzing the detected response (Column 3, Line 45 to Column 5, Line 45; Column 7, Line 16, to Column 21); and in which: the detecting apparatus comprises monitoring apparatus and recording apparatus arranged to monitor and record the response to the seismic event in the form of movements of particles at the earth's surface (Column 4, Line 44 to Column 6, Line 45), from a position spaced from the earth's surface (Figs. 3-8) (Column 4, Line 44 to Column 6, Line 45), over a predetermined response period after the seismic event (abstract; Column 2; Column 3, Line 45 to Column 6, Line 45) (Fig. 9). Berni discloses that the monitoring apparatus is moved relative to the earth's surface during the response period (Column 4, Line 44 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56).

With regard to claim 22, Berni discloses that the monitoring apparatus uses light, in the form of visible light (Column 5, Line 45 to Column 8, Line 19; Column 9; Columns 13-14).

With regard to claim 23, Berni discloses that the monitoring apparatus is movable relative to the earth's surface during the response period (Column 4, Line 44 to Column 6, Line 37; Column 12, Line 37 to Column 16, Line 56).

With regard to claim 25, Berni discloses that the monitoring apparatus comprises several monitoring devices which are used simultaneously at different locations (Column 5, Line 10 to Column 6, Line 37).

With regard to claim 26, Berni discloses that monitoring apparatus comprises a source of coherent light arranged to be directed at the area being monitored, and a receiver for reflected coherent light (Columns 5-6; Column 7, Line 55 to Column 8, Line 3) (Figs. 2-8).

With regard to claim 27, Berni discloses that the monitoring apparatus comprises video recording apparatus and the recorded response is a visual record (Figs. 2-4) (Columns 6-10, 13).

With regard to claim 28, Berni discloses that the earth's surface is the sea bed, the seismic event is arranged to be applied to the sea or directly to the sea bed and the monitoring apparatus is arranged to be spaced above the sea bed (Column 20, Line 63 to Column 21, Line 15).

With regard to claim 30, Berni discloses that the monitoring apparatus is towed (Column 5, Lines 10-45).

With regard to claim 32, Berni discloses deriving from the analyzing step, representations of subsurface layers; and assembling the representatives as a depiction of the geological structure of the region (Column 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berni as applied to claims 1-2, 4, 6-13, 16-19, 21-23, 25-28, 30, and 32 above, and further in view of Donskoy (6134966).

With regard to claim 14, Berni does not disclose that the monitoring apparatus is located from 0.5 to 5 meters above the sea floor during the response period. Berni gives specifics of the apparatus for use in land surveys, but does not give the specifics of the apparatus for marine surveys. Berni mentions that the apparatus can be used in marine surveys, but does not disclose how it would be positioned. Donskoy teaches a method of monitoring seismic waves directed into the ocean bottom by monitoring the vibration of the seabed with a probe beam (Column 4). Donskoy shows in the drawings that the apparatus is located within 0.5 to 5 m above the seafloor (Figs. 1-6) (Columns 1-4). It would have been obvious to modify Berni to include locating the apparatus near the seabed for marine surveys as taught by Donskoy in order to avoid receive the probe signals without interference from other objects located in the water column.

Claims 15, 20, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berni as applied to claims 1-2, 4, 6-13, 16-19, 21-23, 25-28, 30, and 32 above.

With regard to claim 15, Berni discloses that the monitoring apparatus additionally comprises a hydrophone (Column 19, Lines 40-61). Berni discloses that in marine surveys, it is known to record the pressure signal, and this done with a hydrophone.

With regard to claim 20, Berni discloses that the monitoring apparatus comprises a plurality of monitoring devices, the monitoring devices being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event (Columns 5-6). Berni does not specifically disclose that the devices are located on cables, but does disclose that moving the devices would be as easy as moving marine seismic cable detectors. It is therefore obvious that the detectors could be located on a cable in order to be able to move them as is done in a marine survey using streamer cables.

With regard to claim 29, Berni discloses that the monitoring apparatus additionally comprises a hydrophone (Column 19, Lines 40-61). Berni discloses that in marine surveys, it is known to record the pressure signal, and this done with a hydrophone.

With regard to claim 31, Berni discloses that the monitoring apparatus comprises a plurality of monitoring devices, the monitoring devices being spaced from each other by a distance which is less than the wavelength of the transmitted seismic event

(Columns 5-6). Berni does not specifically disclose that the devices are located on cables, but does disclose that moving the devices would be as easy as moving marine seismic cable detectors. It is therefore obvious that the detectors could be located on a cable in order to be able to move them as is done in a marine survey using streamer cables.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT A. HUGHES whose telephone number is (571)272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. A. H./
Examiner, Art Unit 3663

/Jack W. Keith/
Supervisory Patent Examiner, Art Unit 3663